FINAL REPORT

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COLD HARDINESS TRIALS OF NEW PERENNIAL CULTIVARS FOR DOMESTIC AND EXPORT MARKETS

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Cold Hardiness Trials of New Perennial Cultivars

AFIF # 96000390

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Summary

This is the final report and represents information summarized from the first 3 seasons. In addition, a CD-ROM containing pictures of the perennial plots as well as the best perennial selections is attached. On many selections, 3 years of observations are now available such that consistency of growth and development can be observed as well as survival. A total of 13 selections were recommended based on winter survival, date of flowering, longevity and degree of bloom, height, spread and vigour. See Tables 1, 2 and 3 for more information. The selections are:

- *Chelone obligua* 'Turtlehead' survival without mulch: 100% in 3 winters of 1997, 1998, and 1999. Large, distinctive blooms. Consistent date of first flower: August 15 in 1998, August 19 in 1999, August 20 in 2000. Thirty-four to 52 days of flowering, mean height: 80 - 125 cm, mean spread: 70 - 125cm. (Table 2).
- *Calamagrostis acutiflora* 'Karl Foerster'. 100% survival in both 1999 and 2000 at the U of S location and close to 100% at the Day Grow location (Table 1). Long duration of flowering---over 82 days from both locations. Very tall (165 – 170 cm) with spread of 80 – 85 cm (Table 2). Note: growth uneven at Day Grow site likely due to weed competition (Table 3).
- *Eupatorium fistulosum.* 100% survival in 1999 (planted in 1998). While only one year of observation, this selection appears to have superior potential. Tall (125 cm) with large spread (100 cm) and long bloom (51 days). Large floral clusters of purple blooms. Unfortunately, bloom date is late (Aug. 3).
- *Hemerocallis* 'Pastel Pink'. Survival at U of S was 87 – 91% in 2000 and 1999 while Day Grow site was 88% in both years. Flowering dates at the U of S site were August 5 (1999) and July 25 (2000). Flowering dates at the Day Grow site were August 10 (1999) and August 3 (2000). Flowering duration was 52 and 37 days at the U of S site in 1999 and 2000, respectively. At the Day Grow site, flowering duration was lower at 41 and 20 days in 1999 and 2000, respectively (Tables 1, 2, 3).
- *Hemerocallis* 'Evening Gown'. Average survival at both U of S and Day Grow sites were 100% and 96%, respectively in both 1999 and 2000. Flowering dates were August 8 (1999) and July 15 (2000) for the U of S location and July 5 (1999) and July 25 (2000) for the Day Grow site. Flowering duration was longer than 'Pastel Pink' with 49 (1999) and 51 (2000) days at the U of S location, and 79 (1999) and 59 (2000) days at the Day Grow site.
- *Perovskia atriplicifolia*: survival without mulch: 100%, 80% and 70% in the winters of 1997, 1998, and 1999 respectively. Vigorous, floriferous. Fine textured leaves and light purple flowers and best planted on mass. Date of first flower: U of S site: July 27 (1998), July 21 (1999), July 26 (2000). Sixty-five days (1998), 71 days (1999), 58 days (2000) of flowering until frost. Mean height: 110 cm (1998), 140 cm (1999) and 130 cm (2000). Mean spread: 150 cm (1998), 165 (1999), and 120 cm (2000).

- *Polygonatum 'European bistort'*. 100% survival at the U of S site in each of 1998, 1999 and 2000. Very consistent height, spread and date of first flowering. Height: 100 cm in each of 1999 and 2000. Spread: 125 cm (1999) and 100 cm (2000). Date of first flowering was June 8 (1999) and June 7 (2000). Duration of flowering, however, was variable from 114 days (1999) to 44 days (2000). The reason for this variation is not known.
- *Pyrethrum roseum 'Robinson's single'*. 100% survival in each of 1999 and 2000 (U of S site) while Day Grow site expressed 84% survival in each of these years. Bright, floriferous blooms. Growth at the Day Grow site was generally more consistent. U of S site height: 100 cm (1999) and 65 cm (2000). Day Grow height: 70 cm (1999) and 60 cm (2000). Average spread: U of S site was 80 cm (1999) and 45 cm (2000) while Day Grow spread was 60 cm (1999) and 50 cm (2000). Date of first flower: U of S site was June 8 (1999) and June 10 (2000). Date of first flowering at the Day Grow site: June 5 (1999) and June 10 (2000). Duration of flowering was quite variable between the two locations with 42 days (1998) and 39 days (2000) at the U of S site and at the Day Grow site: 97 days (1999) and 39 days (2000).
- *Rudbeckia hirta 'Indian Summer'*. This is an "All American Selection" as well. This cultivar self-seeds readily. Thus, while survival may be reduced to as low as 63%, overall, the longevity of this plant continues through its offspring. Blooms are striking (Yellow petals with dark brown centers), large and floriferous. Height is fairly consistent between the two sites and between years: U of S site---75 cm (1999), 70 cm (2000). Day Grow site height ---- 85 cm (1999), 70 cm (2000). Spread varied: U of S site---100 cm (1999), 50 cm (2000). Day Grow site spread: 70 cm (1999), 45 cm (2000). Flowering dates varied between locations: U of S site was July 5 for both 1999 and 2000. Day Grow site was August 12 (1999) and July 6 (2000).
- *Sidalcea oregana* 'Prairie Mallow': survival without mulch: > 50% (1998), 75% (1999), 70% (2000). Floriferous, seed heads interesting texture, date of first flower is very consistent: July 13 (1998), July 10 (1999), July 17 (2000). Duration of flowering also consistent at 60 days (1998), 71 days (1999), 67 days (2000). Mean height: 88.3 cm (1998), 110 cm (1999), 90 cm (2000). Mean spread: 46.6 cm (1998), 75 cm (1999), 50 cm (2000).
- *Solidaster luteus*. Survived well at both locations. U of S site: 100% (1999) and 87% survival (2000). Day Grow site: 96% survival in each of 1999 and 2000. Extremely floriferous. Yellow/white flowers of fine to medium texture. Best planted on mass. Height: U of S site---85 cm (1999), 60 cm (2000). Day Grow site---50 cm (1999) and 70 cm (2000). Average spread consistent: U of S site---160 cm (1999) and 140 cm (2000). Day Grow location---125 cm (1999) and 130 cm (2000). Date of first flower consistent at the U of S site at August 8 (1999) and August 12 (2000). Day Grow site: August 10 (1999) and August 23 (2000). Duration of flowering also consistent: U of S site about 42 days. Day Grow site duration of flowering: 41 days (1999) and 31 days (2000). Flowering until frost.
- *Thalictrum flauvum glaucum*. Survival very consistent at > 92% in all three winters at the U of S location. Height also consistent and tall at 165 cm (1999) and 160 cm (2000). Spread variable at 130 cm (1999) and 60 cm (2000). Date of first flowering

consistent between years: July 10 (1999) and July 14 (2000). Duration of flowering varies from 31 to 40 days. Good perennial for back borders. Tends to fall over at the end of the season.

Background

Of all the areas in the bedding plant industry, one of the fastest growing is the demand for perennial plants. However, expanding the variety of perennial plants available requires testing to ensure plants sold are winterhardy. Current federal funding has reduced input into herbaceous perennial plant programs to the extent that this activity has been eliminated at the Agri-Food Research Station in Morden, MB. Any project of this nature should be considered long-term. This represents the third report and our request for extension of funding has been granted. This will ensure all the plants originally outlined have been planted and to ensure adequate observation of plant material winter hardiness has occurred.

Objectives

1. To identify new perennial plant species/cultivars for Saskatchewan conditions.
2. To expand and strengthen the greenhouse industry's plant base.
3. To meet the demand by the general public, landscape architects, municipal purchasing offices and land developers for new plant material.
4. To develop a CD-ROM of the best selections identified in this study.

Activities to Date

- The following data was recorded at the U of S location: survival (after establishment and after overwintering, Table 1), date of first flower, days of flowering, height, spread. We now have flowering data for 3 years in some cases (Table 2). Day Grow survival data is summarized in Table 1. Growth and development data in Table 3.

- In addition, a CD-ROM has been compiled of the recommended selections. These can also be placed onto a website. A local couple in Regina (Lee) have already compiled a site at: http://em.ca/garden/home.html Many of our selections are not included on their list.

- We were invited to provide a presentation on this project at the Saskatchewan Horticulture Association Provincial Show in Saskatoon in August, 2000. We also distributed a hand-out (courtesy, Erl Svendsen) of our recommended selections and All America selections we have at the Horticulture Plots. AFIF was thanked for its support of this project.

- Several tours including class tours were provided and included talks on the Perennial project.

- Day Grow location: large signage thanking AFIF and the U of S was placed and visible to the thousands who visited their operation in 2000.

Progress on Milestones

Revised Milestones

This program has been cancelled as of 2001. This represents the final report for this project.

Description	Dates
• Receive and plant material, evaluate survival and date of first flowering of previous years Plantings. Record presence/absence of disease, insects, rate for ornamental value, floriferousness, duration of flowering and plant growth.	May – October, 1999
• Order and receive new plant material Write up progress report.	November, 1999 – April, 2000
• Receive and plant material, evaluate survival and date of first flowering of previous years Plantings. Record presence/absence of disease, insects, rate for ornamental value, floriferousness, duration of flowering and plant growth.	May – October, 2000
• Write up progress report.	January 2001
• Create CD-ROM and submit final report	February, 2002

Personnel

Tim Stacey, Dept. Plant Sciences technician was hired to maintain the site, take data at the U of S location as well as data acquisition at the Day Grow site. Brian Day was responsible for plot maintenance at his location.

Expenses

See attached.

Table 1. Perennial Species and Cultivars % Survival

Cultivar List	U of S Site 1997	1998	1999	2000	Day Grow Site 1997	1998	1999	2000
Acanthus mollis latifolius	24 planted	< 50%						
Anemone tomentosa						50 planted	66%	
A. lesseri	24 planted	> 50%	75 %	50 %				
*****Calamagrostis acutiflora 'Karl Foerster'*****		24 planted	100 %	100 %		24 planted	96 %	96 %
Calamintha ssp. Nepeta	24 planted	> 50%	41%	29%				
*****Chelone obligua 'Turtlehead'*****	24 planted	100%	100%	100%				
C. simplex 'white pearl'	24 planted	< 50%						
Coreopsis rosea	24 planted	< 50%				50 planted	14 %	
Epimendium rubrum								
*****Eupatorium fistulosum*****			24 planted	100 %				
Gaura lindheineri 'Carries's Gold			25 planted	< 50%			25 planted	< 50%
Geum avens 'Mrs.		24 planted	12 %			25 planted	36 %	

Bradshaw'								
G. phaseum purpureum						24 planted	33 %	
G. sylvaticum album 'Wood Cranesbill'			25 planted	52 %			25 planted	48 %
Heliopsis helanthiodes	24 planted	> 50%	83 %	66 %				
Helleborus orientalis 'Red Power'	24 planted	< 50%	20 %			24 planted	< 50%	
H. 'Chicago picotee lace'		24 planted	62.5 %	37 %		24 planted	60 %	48 %
H. 'double talk'		24 planted	75 %	66 %		24 planted	32 %	32 %
*****H. 'evening gown'*****		24 planted	100 %	100 %		24 planted	96 %	96 %
H. 'fran's hals'		24 planted	100 %	91 %		24 planted	44 %	44 %
H. 'Lavender dew'		24 planted	75 %	16 %		24 planted	48 %	
*****H. 'Pastel pink'*****		24 planted	91 %	87 %		24 planted	88 %	88 %
Heuchera 'chocolate ruffles'						24 planted	< 50%	
Incearvillea	24 planted	< 50%						
Lavendula	24 planted	< 50%						
Lavatera oblia		24 planted	< 50 %			24	< 50 %	

'Rosea Malva'						planted		
Ligularia dentata 'Othello'						24 planted	68 %	54 %
Miscanthus 'morning light'	24 planted	< 50%	Replant 25	< 50%			Re-plant 25	< 50%
Panicum 'Haense herns'	12 planted	100 %	92 %	66 %				
Pennisetum. Moudry, black flowered fountain grass			12 planted	< 50%			12 planted	< 50%
*****Perovskia atriplicifolia.****	24 planted	> 50%	79 %	70 %				
Persicaria virginiana varigata						24 planted	< 50 %	
*****Polygonatum 'European bistort'*****	24 planted	100 %	100 %	100 %				
*****Pyrethrum roseum*** 'Robinson's single'**		24 planted	100 %	100 %		25 planted	84 %	84 %
Rodgersia pinnata	24 planted	< 50%	16 %					

Roscoea cantleoides 'Kew Beauty'			25 planted	< 50%				
Rudbeckia hirta 'Goldilocks'		24 planted	8 %			24 planted	Re-plant	
*****Rudbeckia hirta ** 'Indian summer'***		24 planted	63 %	79 % (re-seeds)		24 planted	Re-seeds	
Salvia nemarosa			24 planted	50 %				
Santolina chamaecyparis s 'Lavender Cotton'			25 planted	< 50%			25 planted	< 50%
Schizostylis coccinea 'Crimson Flag'			25 planted	< 50%			25 planted	< 50%
Scrophuleria aquatica 'Variegata' Figwort			25 planted	< 50%			25 planted	< 50%
*****Sidalcea oregana 'prairie mallow'*****	24 planted	> 50%	75 %	70 %				
*****Solidaster luteus*****		24 planted	100 %	87 %		24 planted	96 %	96 %

*****Thalictrum flauvum glaucum*******	24 planted	> 50%	92 %	92 %				
Tradescantia andersoniana 'Charlotte Spiderwort'		24 planted	75 %	50 %		25 planted	84 %	48 %
Verbascum bobyciferum Giant Silver mullein			24 planted	< 50%			24 planted	< 50%
V. 'Pink domino'			25 planted	< 50 %			25 planted	< 50%

****Note: Those selections bolded and underlined are recommended**

Table 2. Perennial Cultivars and Species Growth Profile – U of S site

Cultivar List	Avg. height (cm)		Avg. spread (cm)		Date of first flower		Duration of flowering (days)	
	1999	2000	1999	2000	1999	2000	1999	2000
A. lesseri	45	25	45	40	May 3	June 8	36	38
Calamagrostis acutiflora 'Karl Foerster'	165	170	85	80	July 1	July 9	92	> 92
Calamintha ssp. Nepeta	70		115		July 26		58	
Chelone obligua 'Turtlehead'	125	90	125	120	Aug. 19	Aug. 20	52	34
Eupatorium fistulosum		125		100		Aug.3		51 (frost)
G. sylvaticum album 'Wood Cranesbill'		30		30				0
Heliopsis helanthiodes	130	120	185	140	July 1	July 9	92	62
Hemerocallis. 'double talk'	60	50	60	40	July 26	July 10	39	36
H. 'evening gown'	50	50	45	55	Aug. 8	July 15	49	51
H. 'fran's hals'	70	70	70	50	Aug. 8	July 16	49	39
H. 'Pastel pink'	75	50	85	40	Aug. 5	July 25	52	37
Perovskia atriplicifolia	140	130	165	120	July 21	July 26	71	58 (frost)
Polygonatum 'European bistort'	100	100	125	100	June 8	June 7	114	44
Pyrethrum roseum 'Robinson's single'	100	65	80	45	June 8	June 10	42	39 (frost)
Rudbeckia hirta 'Indian summer'	75	70	100	50	July 5	July 5	87	79 (frost)

Salvia nemarosa		60		90		June 20		84 (frost)
*****Sidalcea oregana 'prairie mallow'*****	110	90	75	50	July 10	July 17	71	67 (frost)
*****Solidaster luteus*****	85	60	160	140	Aug. 8	Aug. 12	43	42 (frost)
*****Thalictrum flauvum glaucum*****	165	160	130	60	July 10	July 14	31	40
Tradescantia andersoniana 'Charlotte Spiderwort'	25	60	45	90	June 21	June 26	38	78 (frost)

**** Note: Bolded, underlined selections are recommended**

Table 3. Perennial Plant Growth, Day Grow location

Cultivar List, **Bolded and underlined are recommended	Avg. height (cm)		Avg. spread (cm)		Date of first flower		Duration of flowering (days)	
	1999	2000	1999	2000	1999	2000	1999	2000
***Calamagrostis acutiflora 'Karl Foerster'**	160	80	60	65	July 1	Few made it to seed	82	
Hemerocallis. 'double talk'	45	32% survival	45		June 22		83	
H. 'evening gown'	60	70	50	40	July 5	July 25	79	59 (frost)
H. 'Pastel pink'	70	60	60	50	Aug. 10	Aug. 3	41	20
Ligularia dentata 'Othello'	70	75	65	75	Aug. 23	Aug. 20	28	34 (frost)
Pyrethrum roseum 'Robinson's single'	70	60	60	50	June 5	June 10	97	39
Rudbeckia hirta 'Indian summer'	85	70	70	45	Aug. 12	July 6	4 (re-seed)	78 (frost)
Solidaster luteus	50	70	125	130	Aug. 10	Aug. 23	41	31 (frost)
Tradescantia andersoniana 'Charlotte Spiderwort'	35	30	40	30	July 6	June 26	75	71